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ABSTRACT: A system promoting a proper recycle of discarded article and contributing economization of energy consumption which will otherwise increase, reduction in the amount of wastes and prevention of environmental pollution due to harmful substances. A recycle system includes an input unit for inputting information concerning article, a storage for storing databases of information for reuse of the articles, a recycle processing method deciding processor for deciding a recycle processing for the article in accordance with recycling rules determined previously by referencing the information for the reuse of the article as contained in the database stored in the storage unit on the basis of the information concerning the article inputted through the input unit, and a recycle factory equipment control unit functioning as an output unit for outputting the result of the decision to a succeeding process.

34 Claims, 33 Drawing figures

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Abstract Text - ABTX (1): A system promoting a proper recycle of discarded article and contributing economization of energy consumption which will otherwise increase, reduction in the amount of wastes and prevention of environmental pollution due to harmful substances. A recycle system includes an input unit for inputting information concerning article, a storage for storing databases of information for reuse of the articles, a recycle processing method deciding processor for deciding a recycle processing for the article in accordance with recycling rules determined previously by referencing the information for the reuse of the article as contained in the database stored in the storage unit on the basis of the information concerning the article inputted through the input unit, and a recycle factory equipment control unit functioning as an output unit for outputting the result of the decision to a succeeding process.

Brief Summary Text - BSTX (5): There can be conceived various reasons why promotion of the recycle of the discarded articles such as discarded appliances for home use or proper waste disposal processing has made little progress, one of the major reasons for which can be explained by the fact that information necessary for realizing the recycle of the discarded articles as collected and the proper disposal of the wastes is scarcely available. In practice, attempts for recycle processing of the discarded articles or proper wastage disposal actually encounter difficulty in that

the method or means for realizing such processings can not be determined because of lack of the information concerning the materials or substances from which the discarded articles are made as well as the information concerning presence or absence of harmful and/or hazardous materials or substances in the discarded articles. Consequently, most of the discarded articles are disposed of as the wastes. In the present states of the art, the information required for carrying out the recycle processing method for the discarded articles and the proper waste disposal processing method is difficult to acquire. By way of example, any one of the manufactured article contains little indication or information concerning a disassembling method, component parts and materials thereof. On the other hand, the manufacturer affords no system or facility for presenting such information. For the reasons mentioned above, many or most of the discarded articles are disposed of as wastage without undergoing any proper or appropriate recycle processing.

Brief Summary Text - BSTX (6): It is an object of the present invention to provide a manufactured article recycling system for determining or deciding methods of realizing recycle processings proper for various discarded articles by making it possible to collect, process and furnish speedily a variety of information required for the processings or treatments of the discarded articles, to thereby reduce the amount of wastes and make the much of limited fossil fuel resource.

Brief Summary Text - BSTX (8): With a view to promoting the recycling of the discarded articles and realizing proper disposal processings or treatments of the discarded articles, the present invention provides a manufactured article recycling system for deciding a recycle processing for the purpose of determining capability/allowability of reuse of an article, which system includes a reading means for reading information affixed to the article, a storage means for storing a database of article reuse oriented information which bears correspondence to the information affixed to the article for reuse of the article, a recycle decision means for deciding a recycle processing for the article by referencing the article reuse oriented information of the database stored in the storage means on the basis of the information affixed to the article inputted through the reading means, and an output means for outputting result of the decision made for the article by the recycle decision means.

Brief Summary Text - BSTX (10): Further, for facilitating reuse of the article, the article may be equipped with a memory means for storing as information concerning the article at least such information as the name of article, manufacturer name of the article, model name of the article, manufactured date, manufacturing number, and component parts of the article, and an output means for outputting the information stored in the memory means.

Brief Summary Text - BSTX (11): In the system according to the present invention, article information required for deciding the recycle processing method is made available by the reading means. As the article information to be read by the reading means, there may be mentioned the information concerning at least the name of the article, the manufacturer name of the article, the model name of the article, manufactured date, manufacture ID number, component parts of the article and the like. The reading means for inputting the information concerning the article may be at least one selected from a group which consists of a connecting means connected to the article for reading information concerning the article, a radio receiver means for receiving the

information concerning the article sent out from a radio transmitter means which is provided in association with the article, a keyboard for receiving the information concerning the article through key manipulation, a mouse used for receiving the information concerning the article, a bar code reading means for reading a bar code when information concerning the article is indicated by the bar code, and a driving means for driving memory means when the information concerning the article is stored in the memory means.

Brief Summary Text - BSTX (12): The storage means may include as the database an article specifications information database for storing life limit information concerning a restoration-allowable life limit of the article, a statutory regulation/standard information database for storing statutory regulation information concerning the statutory regulations imposed on the manufactured articles on an article-by-article basis and standard information concerning the standards previously established for the manufactured articles on an article-by-article basis, a material-based recycle processing method database which stores information concerning harmfulness or hazardousness of the materials of the component parts and recycle processing methods for the materials, respectively, a part-based recycle processing method database which stores recycle processing methods for the component parts, and a market information database which stores price information on the market of used articles for the article.

Brief Summary Text - BSTX (13): The recycle decision means can make decision as to the proper recycle processing method or disposal processing method of the discarded article. For example, the recycle decision means can decide on the basis of the information concerning the article as inputted through the reading means as to whether or not the article satisfies condition that the article has a remaining life falling within the restoration-allowable life limit of the article as stored in the article specifications information database, wherein when the remaining life of the article falls within the restoration-allowable life limit, the recycle decision means issues such recycle processing decision or judgement result which indicates that the article is subject to restoration as a restored article, and if otherwise, the recycle decision means issues such recycle processing decision result while indicates that the article is subject to a disassembling processing for disassembling the article to individual component parts.

Brief Summary Text - BSTX (14): Because the discarded article processing method decided is transmitted or messaged to the discarded article processing line by the processing result output means, appropriate recycle processing can be carried out in accordance with the processing decision result. The output means may include at least one of a voice output means for generating voice information, a video information output means for generating image information and a printing means for generating printed information in order to output the results of the decision made by the recycle decision means. When the system further includes an equipment control unit for controlling facilities for executing the recycle processing on the basis of the result of decision made by the recycle decision means, it can control the equipment or facilities of the recycling factory, to thereby command the process for the disassembling works.

Drawing Description Text - DRTX (3): FIG. 2 is a flow chart showing a recycle method decision procedure and a recycle processing executing procedure.

Drawing Description Text - DRTX (4): FIG. 3 is a flow chart illustrating a recycle processing step decision procedure for component parts/assemblies after disassembling,

Drawing Description Text - DRTX (14): FIG. 13 a view for illustrating conceptually an article information reading process in a recycling factory,

Drawing Description Text - DRTX (33): FIG. 32 is a flow chart illustrating a processing procedure generating procedure (for recycle processing other than article restoration processing).

Detailed Description Text - DETX (4): In each of the recycling factories 6 and 7, information as required is collected in accordance with recycling rules (1) to (6) mentioned hereinafter, whereon recycling methods are determined or decided for the individual discarded televisions as collected, which is then followed by recycle processings. At this juncture, with the recycling method, it is intended to mean a method of reusing the discarded article. To this end, each of the recycling factories 6 and 7 is equipped with a recycling system for the discarded televisions in order to determine or decide the recycling methods for given ones of the discarded televisions, respectively. As is illustrated in FIG. 5 (which will be elucidated later on), the article recycling system is composed of an input unit 34 for inputting information concerning the articles as "an information acquiring means" for making available a variety of information required for the decision mentioned above, a storage unit 350 for storing databases concerning information required for the reuse of the articles, a recycle method decision processor unit 29 for deciding a recycle processing for a given article in accordance with the recycling rules prepared previously by referencing the information of the article destined for reuse as contained in the database stored in the storage unit 350 on the basis of the information concerning the article inputted through the medium of the input unit 34, and a recycling factory facility control unit 39 which serves as "an information transmitting means" for transmitting the result of the decision made by the recycle method decision processor unit 29 to a succeeding process without fail and which thus functions as the output unit for generating the result of decision made for a given article as an output. The recycle method decision processor unit 29 installed in association with each of the recycling factories 6 and 7 decides the recycling method in accordance with the recycling rules (1) to (6) mentioned below and at the same time executes the processing relevant for the recycling method as decided while determining distribution/delivery routes for the articles undergone no processing as well as the articles having been subjected to the processing.

Detailed Description Text - DETX (22): Referring to FIG. 5, the recycle method decision processing system includes a recycle method decision processor unit 29 for making decision as to the recycle processing method, an input unit 34 for inputting information, a recycling factory facility control unit 39 for controlling equipment and others installed within the recycling factory, a use history information accumulating unit 40 for accumulating use history information on an article-by-article basis, a storage unit 350 for storing a database of information concerning the reuse of manufactured articles and a recycle method decision result storage unit 79 for storing the results of the recycle processing methods decided or determined by the recycle method decision processor unit 29.

Detailed Description Text - DETX (29): The recycle method decision processor unit 29 further includes a recycle method decision module 31 which stores therein a recycle processing decision procedure 32 and a recycle procedure generating module 33 for generating a recycle processing method for the discarded article for which the recycle processing method has been determined or decided. Additionally, by taking into consideration the necessity of modifying the recycling rules and the recycle method decision procedure, as occasion demands, since new recycle processing methods will be developed from one to another with the optimal recycle processing method changing correspondingly, the system of concern is provided with a recycle method decision procedure editing module 30 in order to make it possible to correct or modify the recycle method decision procedure .

Detailed Description Text - DETX (30): Parenthetically, in conjunction with the recycling rules and the recycle method decision procedures based thereon, it is advantageous from the viewpoint of management or administration to determine a section for managing the recycling rules and the recycle method decision procedures based thereon on a company-by-company basis to thereby manage en bloc generation of the recycling rules and the recycle method decision procedures, storage thereof as a database, correction thereof and other relevant activities. In that case, the recycling factories 6 and 7 should be provided with facility for accessing the database mentioned above in order to obtain the recycling rules updated latest as well as the recycle method decision procedure based thereon so that the recycling rules and the recycle method decision procedure can be stored in a recycle method decision module 31 incorporated in the recycle method decision processor unit 29 installed in each of the recycling factories 6 and 7.

Detailed Description Text - DETX (31): Besides, the recycling factory facility control unit 39 includes a processing result display device 38 for displaying the results of processings, a disassembling line control unit 42 for controlling disassembling-line facility for the recycling, and an information output printer 48 for printing out the results of the processings and other data.

Detailed Description Text - DETX (32): As the databases to be stored in the storage unit 350, there may be mentioned a statutory regulation/standard information database 36 for storing information of various legal or statutory regulations and standards, a material/part-based recycle method database 37 for storing recycle processing methods on a material-by-material basis and on a part-by-part basis, an article specifications information database 35 for storing article specifications information and a market information database 41 for storing information concerning market prices of used articles, part demand information and the like.

Detailed Description Text - DETX (34): On the other hand, a material/part-based recycle method database 37 is designed to store therein information concerning the recycle processing method on a material /part basis, as can be seen in FIG. 29. The recycle processing method information is also managed as a database implemented in the form of tables on a material/part basis internally of the enterprise. To this end, the material/part-based recycle method database 37 is so realized as to store the recycle processing method for each of the parts constituting an article as well as the recycle processing method for each of the materials of the parts constituting the article, as is shown in FIG. 29. By way of example, in the case where the article of concern is a color

television, such a processing method is stored as a component parts-based recycle processing method that a cathode ray tube assembly or CRT ASSY which constitutes a part of the television is sent to a CRT-dedicated processing factory after removal of belongings thereof such as a deflecting yoke and other.

Detailed Description Text - DETX (35): In the article specifications information database 35, there is previously stored the article specifications information, as shown in FIG. 7. This information is also stored orderly in the form of a database on the basis of manufacturer name, category of article, model name and others, respectively, internally of the enterprise. Referring to FIG. 7, the article specifications information is affixed to each of manufactured articles when they are shipped and may store category of article indicating name of the manufactured article, manufacturer name, model name, manufacture ID number and the restoration-allowable life limit as the basic information and additionally size, outer dimensions, weight and dissipation power as the design information as well as the name of component part, material thereof, material/part manufacturer, grade, weight, number, restoration-destined article, use history, part exchange date, etc., respectively, as the component part information. These article specifications information may be stored on an article basis or stored en bloc for all the articles as a database.

Detailed Description Text - DETX (36): In the market information database 41, there are stored information concerning the market prices of the used articles, stock information of the parts for maintenance, information concerning the demand for the articles of concern, etc., internally of the enterprise or company, as shown in FIG. 30. By way of example, the market information database 41 stores therein the market prices of the used articles for each of the types of the articles so that the market price information can be obtained when the restored article such as the restored televisions are to be recycled as the used article, as can be seen from FIG. 30. Besides, the information concerning the market prices of the used component parts of the article is also stored so that the market prices of the parts can be made available when they are to be recycled as the used parts.

Detailed Description Text - DETX (38): Next, description will turn to the recycle method decision procedure in the system described above. FIG. 2 shows a recycle method decision procedure and a recycle processing executing procedure.

Detailed Description Text - DETX (39): Referring to FIG. 2, upon reception of a discarded television by the recycling factories 6 and 7, information concerning the discarded television inputted from the article specifications information database 35 shown in FIG. 5 is acquired (step 201), whereon the recycle processing method for the discarded television is decided on the basis of the acquired information. For deciding the recycle processing method, it is first determined whether the discarded television can be restored as a useful article in a restoration capability decision step 203 which is composed of three steps mentioned below.

Detailed Description Text - DETX (43): On the other hand, when any one of the three conditions mentioned above is not satisfied, the discarded article of concern is transferred to other recycle processing than the article restoration processing. More specifically, the recycle processing

method is determined for each of component parts of the discarded article which can not pass the above-mentioned test, whereupon the relevant recycle processings are executed. In that case, however, the recycle method decision procedure becomes different in dependence on whether the discarded television of concern falls within the restoration-allowable life limit or exceeds that life limit.

Detailed Description Text - DETX (45): Next, description will be directed to the recycle method decision procedures for the component parts undergone the decision processings in the steps 206 and 207, respectively.

Detailed Description Text - DETX (46): FIG. 3 illustrates a recycle method decision procedure for component parts exited the step 206.

Detailed Description Text - DETX (47): At first, from the information concerning the component parts constituting the discarded television as well as the information concerning the disassembling of the discarded television which is stored in the article specifications information database 35, information concerning the parts and the assemblies which are separated when the discarded television is disassembled or decomposed is extracted for each of the parts and the assemblies (step 206a), whereupon decision is made as to whether the parts or the assemblies can be reused in a step 206b. The parts or the assemblies which satisfies both the conditions that the parts or the assemblies can be reused (206b1) and that the parts or the assemblies meet the statutory regulations and the standards to be satisfied (206b2) are decided as reusable part candidates (206b3). On the contrary, unless any of the conditions mentioned above is satisfied, the processing proceeds to the step 206c where the other recycle processing method than the reusing of the component parts is determined for those which do not satisfy any one of the two conditions mentioned above.

Detailed Description Text - DETX (53): In the foregoing, the contents of the recycle method decision procedure executed in the step 206 for the component parts have been described.

Detailed Description Text - DETX (54): Next, description will turn to the recycle method decision procedure for the component parts undergone the processing step 207. FIG. 4 illustrates in detail the recycle method decision procedure executed in the step 207. The processing shown in FIG. 4 is designed to determine the processing methods for those component parts which exceed the restoration-allowable life limit. Consequently, the processing of FIG. 4 is equivalent to that shown in FIG. 3 except for the procedure starting from the step 206 and ending in the reusability decision step.

Detailed Description Text - DETX (55): Referring to FIG. 4, the information concerning the parts or assemblies separated or detached upon disintegration of the discarded televisions is derived from the information concerning the disassemble information of the discarded televisions as well as the information concerning the component parts constituting the discarded televisions (step 207a). Thereafter, the recycle processing methods other than those for the reuse of the parts and the assemblies are decided (207b1 to 207b3), as described hereinbefore in conjunction with the step 206c, and then it is decided on the basis of the result of the decision processing mentioned

just above whether the parts and/or the assemblies are for the restoration-destined material or for the recovery of energy or for the fragmentation (shredding)/classification processing or alternatively for the specific treatments because of harmful materials and/or hazardous materials as contained (207b5 to 207b9). This processing routine is executed for all the parts or the assemblies detached and separated from one another upon disassembling of the discarded televisions.

Detailed Description Text - DETX (57): After the recycle processing methods have been determined for the component parts of the discarded television in the steps 206 and 207 as mentioned above, the discarded television is decomposed or disassembled on the basis of the disassemble information of the discarded television (step 208), and the component parts mentioned above are separated or classified to be subsequently processed on the basis of the result of the component part recycle processing method decision (step 209 to 223). The reuse-destined part candidates (step 209) are then checked or inspected as to the quality, whereon decision is made whether they can be reused or not (step 216), which in turn is followed by a part reuse processing (step 216), while for those parts which can not be reused, decision is made as to what processings or treatments they have to undergo except for the reuse-destined processing (step 217), whereon the processing based on the result of the above decision is performed. At that time, for the assembly which is inhibited from the reuse, the recycle processing method is determined for each of the parts constituting the assembly. Thereafter, the parts which are not reusable undergo respective recycle processings in accordance with the result of the aforementioned decision.

Detailed Description Text - DETX (58): Of course, the parts and the assemblies separated or classified in dependence on the recycle processing methods (step 210 to step 214) are subjected to the corresponding recycle processings, respectively. Among them, in the recycle processing for the multi-material parts (resulting from the processing step 223), they are fragmented to be subsequently separated into the restoration-destined materials and the energy-recovery-destined materials. In this way, the recycle processing method decision/execution procedure is executed for the discarded article. The recycle processing method decision/execution in the instant system now under consideration is characterized in that such recycle processing methods are determined which exert adverse influence to the environment as little as possible while taking it into consideration to put the discarded articles into reuse without burning or disposing of them as the waste articles. In other words, the recycle processing methods are discriminatively determined to be subsequently executed in accordance with such "recycling rules" that discarded articles are transformed to restored articles to a possible maximum extent so long as the requirements imposed by the statutory regulations or the standards are satisfied, while for those discarded articles which can not be restored, the component parts or assemblies thereof which are reusable are processed to the state suited for the reuse, wherein those discarded articles from which no reusable parts or assemblies can be recovered are checked as to the possibility of reuse as the resource materials, while for those discarded articles having parts and assemblies which can not clear the requirements for the reuse as mentioned above are checked as to the possibility of reuse as the materials for energy recovery (for oil extraction, conversion to ethanol, transformation to solid fuel material and, if otherwise, burning). Finally, the discarded articles as well as the component parts and/or assemblies thereof are disposed of as the waste for a landfill.

Detailed Description Text - DETX (60): For the decision or determination of the recycle processing methods described hereinbefore, there are required databases for storing a variety of information or data. Next, description will be made of the information which is necessary for the decision or determination of the recycle processing methods.

Detailed Description Text - DETX (61): The information may generally be classified into four kinds of information, i.e., (1) article specifications information of discarded articles, (2) article use history information, (3) statutory regulation/standard information, (4) recycle processing method information on a part/material basis, and (5) market information . These kinds of information have respective contents and sources from which they can be acquired or available, as follows:

Detailed Description Text - DETX (66): Contents: outer dimensions, weight, performance information (such as dissipation power), information of component parts (part number, part name, manufacturer, model name, material, material manufacturer, weight, information concerning harmful/hazardous parts, information concerning reusable part candidate, use history, etc.), disassembling method, assembling method, quality check method, etc.

Detailed Description Text - DETX (75): Contents: information concerning recycle processing methods on a material /part basis.

Detailed Description Text - DETX (76): Available information sources: recycle processing method information database on a material /part basis provided externally of discarded articles

Detailed Description Text - DETX (78): Contents: information of market prices of used articles, part demand information, etc.

Detailed Description Text - DETX (90): Additionally, the article use history information accumulated in each of the manufactured articles can be read out from the articles at a time point for making decision as to the recycle processing and stored in the history information accumulating unit 40 provided in association with the recycling system installed in the recycling factory. By storing cumulatively or accumulating the article history information in the history information accumulating unit 40, it is possible to take statistics of the use history information of the manufactured articles, for example, on an article-category basis, which in turn means that the status of use of the manufactured articles of concern can quantitatively be grasped, the result of which can be reflected onto the designing of the article at the manufacturer side. Thus, optimal design of given article can be realized. Moreover, owing to the possibility of referencing the article use history information, overspecifications with excessively large margin or underspecifications with excessively small margin can definitely be determined, whereby feedback information for realizing design of the article with optimal specifications is made available. Thus, article to be manufactured can be designed within a range of tolerance which ensures safety and reliability.

Detailed Description Text - DETX (94): Furthermore, the other information, i.e., the statutory

regulation/standard information (3), the recycle processing method information (4) and the market information (5) can be made available by providing the corresponding databases in the recycling factory.

Detailed Description Text - DETX (109): FIG. 17 is a view illustrating an article information read-out method for the discarded article 21 having the article information storage unit 21a imparted with the radio transmitter function. As is shown in FIG. 17, electric power is supplied to the discarded article 21 from the power supply receptacle 54 mounted on the discarded article carrier plate 53 to thereby operate the discarded article 21. In the operated state, a predetermined information transmitting command is inputted by turning on an information transmitting switch or the like, to thereby cause the article information storage unit 21a imparted with the radio transmitter function to send out the article information, whereby the information is received by the information receiver unit 44 connected to the recycle method decision processor unit 29.

Detailed Description Text - DETX (111): FIG. 19 is a view illustrating a method of reading out the article information from the discarded article 21 having the article information storage unit 21a imparted with the radio transmitter function and additionally the article information storage unit dedicated power-supply input unit 21i. As is shown in FIG. 19, the article information storage unit 21a can be driven by connecting the article information storage unit dedicated power-supply input unit 21i to the power supply plug 55 mounted on the discarded article carrier plate 53 and supplying electric power. In the operated state, a predetermined information transmitting command is inputted by turning on an information transmitting switch or the like, to thereby cause the article information storage unit 21a imparted with the radio transmitter function to send out the article information, whereby the information is received by the information receiver unit 44 connected to the recycle method decision processor unit 29.

Detailed Description Text - DETX (113): FIG. 21 is a view illustrating a method of reading out the article information from a discarded article 21 including the removable type article information storage unit 21a which is equipped with the transmitter function. The article information storage unit 21a as removed is driven by supplying electric power thereto from the article information storage drive unit 50, whereon a predetermined information send-out command is inputted by closing an information transmitting switch. As a result of this, the article information is transmitted from the article information storage unit 21a with the transmitter function, whereby the article information is received by the information receiver unit 44 connected to the recycle method decision processor unit 29.

Detailed Description Text - DETX (116): Moreover, the input units for inputting or loading the article information may be designated to the recycle method decision processor unit 29 in advance or alternatively the input units may selectively designated as the occasion requires.

Detailed Description Text - DETX (119): After having acquired the article information (article specifications information and article use history information), the recycle method decision processor unit 29 determines the recycle processing method for the discarded article in accordance with the recycle processing decision procedure 32 stored in the recycle method decision module

31 incorporated in the recycle method decision processor unit 29 while acquiring from the various databases the information required for determining the recycle processing method as the occasion requires. The recycle processing decision procedure 32 is executed in the manner as briefly described hereinbefore by referring to FIG. 2. In the following, the recycle processing decision procedure 32 will be elucidated in more detail. The results of decisions obtained by executing the recycle processing decision procedure 32 in the recycle method decision module 31 are stored in a recycle processing method decision result storage unit 79 together with the names of the relevant manufactured articles and the manufacture ID numbers thereof or together with all the component parts (or assemblies) of the discarded article which is not to be restored. Additionally, the result of the decision may be affixed to the concerned article or each part of the article. As an affixing method, a sheet of paper or the like on which the reusable part information 64 and the disassembled part information 62 are printed may be affixed to the article or the component part, as illustrated in FIG. 15 and described later on.

Detailed Description Text - DETX (122): Next, decision is made as to the possibility of the discarded television subjected to the recycle processing being capable of restoration as a used television (step 203). In that case, on the basis of the category of the article (television in the case of the example now under consideration) contained in the acquired article specifications information, the statutory regulation/standard information concerning that category of article (e.g. concerning the television) is retrieved from the statutory regulation/standard information database 36. Thereafter, the acquired statutory regulation/standard information concerning the television and the article specifications information of the discarded television are compared with each other (step 203a in FIG. 2). By way of example, let's assume that a statutory regulation to the effect "use of lead (Pb) is inhibited" exists. In that case, the data of materials forming the component parts is retrieved from the component part information contained in the article specifications information of the discarded television illustrated in FIG. 7, to thereby decide whether or not the discarded television concerned has any component part containing lead (Pb). In the case of the example illustrated in FIG. 7, the substrate assembly (PWB ASS'Y) designated by the part number "3" and the cathode ray tube (CRT) fall within the category of the component part containing lead (Pb). Thus, it is decided that the discarded article of concern does not meet the statutory regulation.

Detailed Description Text - DETX (125): FIG. 31 illustrates processings executed in the step 203c. Referring to FIG. 31, the quality check method and the reference or standard data of the discarded television established previously are read out from the article specifications information restored in the discarded television or the article specifications information database 35 shown in FIG. 5 (step 203c1). In accordance with the method and the data, the quality check procedure is generated by the recycle processing generating module 33 shown in FIG. 5, whereupon the procedure(s) as generated is displayed on the processing result display device 38 (step 203c2). Thus, the worker can perform the quality check in accordance with the check procedure as displayed (step 203c3). Furthermore, in accordance with the procedure as generated, the line control is performed by the line control unit 42. After the check processing, operator makes decision as to whether or not the quality criteria can be satisfied (step 203c4). When the quality criteria are met, operator checks whether there exist items to be checked or not (step 203c5). After

completion of the check of all the items, the articles satisfying the quality criteria are restored as reusable articles in a step 204. On the contrary, those which do not satisfy the quality criteria are transferred to a part/assembly recycle processing method decision step 206 as the objects for decomposition processing. In this manner, the quality check can be realized for the discarded televisions.

Detailed Description Text - DETX (128): It should further be mentioned that when component parts and others are exchanged in the course of the article restoration processing, the contents of such exchange are added to the article specifications information stored in the article specifications information storage unit of the discarded article 21. More specifically, the date of the part exchange is recorded at an address of part exchange date for the replaced part in the component part information data, and when the replaced part is a used one, the use history (years of use) thereof is recorded at an address for the use history (refer to FIG. 7). Of course, such part exchange may be required in any other process than the recycle processing, for example, in the maintenance. In such case, there will arise a need for similar part exchange processing. Under the circumstances, an apparatus for altering the article specifications information should be installed in the service station 11 which is in charge of maintenance. Additionally, there is conceivable such a case in which an article to be repaired undergoes a part exchange treatment in the store 3 instead of the service station 11. Accordingly, an apparatus for altering the article specifications information should be installed at the store 3 as well. In that case, it becomes equally possible to record the sale date of the article in the article information storage unit thereof at the store 3 (by providing previously the sale data recording addresses in the article use history information storing field of the article information storage unit), whereby the warranty period can easily be confirmed. Furthermore, by providing maintenance history information recording addresses in the article history information storage unit or field, it is possible to record the date and contents of maintenance in the article information storage unit when the article undergoes maintenance processing. Such data can provide not only reference for subsequent maintenance but also useful information for the restoration of discarded article and for the reuse of the component part.

Detailed Description Text - DETX (129): For the discarded televisions having been decided not to be restored or recycled in any one of the steps 203a, 203b and 203c described previously, the recycle processing method for the parts constituting the discarded television is decided before disassembling the discarded television. In that case, the recycle method decision procedure becomes partially different in dependence on whether or not the discarded television is within the restoration-allowable life limit.

Detailed Description Text - DETX (132): At first, from the disassembling method information and the component part information contained in the article specifications information of the discarded television of concern, information of component part or assembly is inputted for each of the parts or assemblies detached separately from the discarded television upon disassembling thereof. For the assembly, information of parts or elements constituting that assembly as well as information thereof is inputted (step 206a).

Detailed Description Text - DETX (133): Subsequently, for the part or assembly whose

information has been inputted, decision is made as to the possibility of reusing the same, i.e., reusability thereof (step 206b). To this end, the step 206b includes three steps mentioned below.

Detailed Description Text - DETX (134): Step 206b1: it is decided whether or not a part or assembly of concern can be subject to the reuse. The part or assembly subject to the reuse has previously been determined when a discarded article was manufactured, and thus the information as to the reuse of the part or assembly is contained in the component part information which constitutes a part of the article specifications information . Thus, the information of the part or assembly as inputted contains data indicating whether or not the part or assembly of concern is subject to the reuse. In the case of the instant embodiment of the invention, data "1" recorded at a reuse-destined part address 71 indicates the reuse-destined part or assembly, while "0" recorded at that address indicates the part or assembly not destined for the reuse. Decision as to the reuse of the part or assembly is ordinarily made on the basis of this data . However, in case the demand information of the part or assembly or stock information thereof is available from the market information database 41, the market information may be used with priority. By way of example, let's assume that a given part or assembly is designated as "part or assembly subject to or destined for reuse" by the component part information . In that case, when the relevant available market information indicates "large amount of part or assembly as stocked and hence little demand therefor", decision then may be made such that the given part or assembly is not to be reused. On the contrary, even when a part or assembly is not designated as the part or assembly destined for the reuse by the component part information, decision may nevertheless be made such that the part or assembly of concern is to be reused, when the information indicating that demand for the part and the assembly exists is derived from the market information .

Detailed Description Text - DETX (135): Step 206b2: For the part or assembly decided as being destined for the reuse in the step 206b1 described above, it is then decided whether or not the part or assembly satisfies the statutory regulations/standards. In this steps, the statutory regulation/standard information concerning the television obtained from retrieval of the statutory regulation/standard information database 36 is compared with the component part information of the part or assembly, similarly to the step 203a shown in FIG. 2. By way of example, when it is legally or statutorily regulated that "use of lead (Pb) is inhibited", the current decision step is executed on the basis of the material information of the part or assembly as inputted. By way of example, among the parts shown in FIG. 7, a CRT (cathode-ray tube) identified by a part number "5" is a reuse-destined part. However, the CRT is decided as not to be reused because it contains lead (Pb).

Detailed Description Text - DETX (139): Steps 206c1 and 206c9: Step of determining or deciding a special processing/treatment necessitating part containing harmful or hazardous material(s). On the basis of the part or assembly information as inputted, it is decided by reference to the material/part-based recycle method database 37 whether or not the part or assembly of concern is harmful or hazardous and necessitates special detoxification treatment or the like. When this decision or judgement results in affirmation, the part or assembly is then decided as a special processing/treatment necessitating part. By way of example, let's consider a cable identified by a part number "7" among those shown in FIG. 7. This cable is decided as a harmful component

part on the basis of the information that the coating of the cable is made of polyvinyl chloride (PVC) and the information that polyvinyl chloride (PVC) is a harmful material, by referencing the material/part-based recycle method database 37. Result of the above decision is stored in the recycle processing method decision result storage unit 79, while at the same time a message indicating the special processing/treatment necessitating part is affixed to the part or assembly. The part or assembly which does not belong to the special processing/treatment necessitating part group is transferred to a succeeding decision step (step 206c2).

Detailed Description Text - DETX (140): Step 206c2, 206c8: Step of deciding a multi-material part. On the basis of the information of a part or assembly as inputted, it is decided that the part or assembly is a multi-material part when the part or assembly is composed of two or more different materials which can not be decomposed or divided any further. In the case of the multi-material part, indication of a part requiring shredding (fragmentation)/separation is affixed to the corresponding part or assembly. The irrelevant part or assembly undergoes a further decision processing in a next step (206c3).

Detailed Description Text - DETX (141): Steps 206c3, 206c5, 206c6, 106c7: Steps of making decision as to material-restoration-destined part or assembly, energy-recovery-destined part or assembly or waste part or assembly. On the basis of material information of the part or assembly as inputted, the recycle processing method for the materials of the part or assembly is retrieved from the material/part-based recycle method database 37. When the recycle processing method as retrieved is the recycle processing method for restoring the material, then the part or assembly is decided as the material-restoration-destined article or part, while when the recycle processing method represents the energy recovery processing, the part or assembly is decided as the energy-recovery-destined part or assembly. When the recycle processing method as retrieved indicates none of the processings mentioned above, it is then decided that the part or assembly concerned is destined to be disposed of as the waste article or assembly. The results of the decision, i.e., the material-restoration-destined part or assembly, energy-recovery-destined part or assembly, is stored in the recycle processing method decision result storage unit 79 and at the same time labeled to the relevant part or assembly.

Detailed Description Text - DETX (142): The steps mentioned above are repetitively executed for making the aforementioned decisions for all the parts and/or the assemblies constituting the discarded television. The recycle method decision procedures for the parts or assemblies detached separately from the discarded television after decomposition thereof, as executed in the step 206, will now be understood from the foregoing.

Detailed Description Text - DETX (144): As is apparent from the foregoing, in the recycle method decision processor unit 29, the recycle processing methods for all the parts or assemblies dismounted from the discarded television upon decomposition thereof are decided, whereon the processing procedures are generated by the recycle procedure generating module 33 on the basis of the results of the decisions and the disassembling method information of the discarded television.

Detailed Description Text - DETX (145): By reference to FIG. 32 which is a view showing a processing procedure generating flow for illustrating operation of the recycle procedure generating module 33, description will now be made of the recycle processing procedure .

Detailed Description Text - DETX (146): Referring to FIG. 32, when the recycling methods for the component parts of the discarded article are decided by the recycle method decision module 31 (step 320), as described hereinbefore, the results of the decisions are stored in the recycle processing method decision result storage unit 79 (step 321). The recycle procedure generating module 33 reads out the disassembling method or disassembling procedure information of the discarded article of concern from the article specifications information database 35 such as shown in FIG. 7 (step 323). Further, the recycle processing methods for detaching separately the parts in each of the disassembling procedure are read out from the recycle processing method decision result storage unit 79 by retrieving the same (step 324). The discarded article disassembling method or disassembling procedure information read out from the article specifications information database 35 and the recycle processing methods for the detached parts read out from the recycle processing method decision result storage unit 79 are displayed in combination on the processing result display device 38 shown in FIG. 5 as the recycle processing procedure . As typical example of the contents of the processing results displayed on the processing result display device 38, there may be mentioned ones illustrated in FIG. 14. For more details, description will be made later on.

Detailed Description Text - DETX (147): In accordance with the recycle processing generated by the recycle procedure generating module 33, the discarded television is disassembled or decomposed in the recycling factory (step 208), as illustrated in FIG. 2, whereon the detached or dismounted parts or assemblies are classified on the basis of the recycle processing methods, respectively, (steps 209 to 214 in the same figure), and then the corresponding or relevant recycle processings are executed respectively (steps 215 to 223 in the same figure).

Detailed Description Text - DETX (148): FIG. 14 shows conceptually or pictorially a disassembling process in the recycling factory 6 or 7. For the discarded television subject to the recycling, the article information is read-out in an article information read-out process (see FIGS. 16 to 22) to be subsequently inputted to the recycle method decision processor unit 29 in which the recycle processing method for the discarded television concerned is decided by the recycle processing decision procedure 32 on the basis of the input data. Thereafter, the discarded television is transferred to the disassembling process on and along the recycle processing line 51. In the disassembling process, the processing result display device 38 and the information output printer 48 connected to the recycle method decision processor unit 29 are utilized.

Detailed Description Text - DETX (149): In the disassembling process illustrated in FIG. 14, the disassembling procedure for the discarded television 21 is displayed on the processing result display device 38 upon arrival of the television. On the other hand, the information concerning the parts to be detached and separated in the disassembly process is printed out on a sheet of paper or the like by means of the information output printer 48. The information as outputted may contain the identification number, name, material, weight, recycle processing method and the use history of each part detached and separated in the disassembling process as well as the

manufacturer name of the manufactured article in which the parts are used, the article name, the model name, the manufactured date, the manufacture ID number, etc. of the article, which are displayed in the form of characters and bar codes. FIG. 14 shows, by way of example only, a process for detaching and separating a cover 60 from a discarded television. A disassembling worker 61 detaches and separates the cover 60 from the discarded television while viewing the disassembling procedure displayed on the processing result display device 38. Then, the cover 60 as separated is affixed with the disassembled part information 62 and placed on a disassembled part transferring line 63. The cover 60 as placed on the disassembled part transferring line 63 is transported to a treatment process in accordance with recycle processing method indicated by the disassembled part information 62 concerning the cover. On the other hand, the discarded television 21 from which the cover 60 has been detached is transported to a next disassembling process where another part is detached and separated to be placed on the disassemble part transport line similarly to the cover.

Detailed Description Text - DETX (150): On the other hand, the cover 60 placed on the disassembled part transferring line 63 is transported to a material restoring process in accordance with the disassembled part information 62 affixed on the cover 60. In the material restoring process, the disassembled part information 62 concerning the above-mentioned cover is visually read out by the worker or read out by a bar code reading device or the like, whereon the material restoration processings or treatments (fragmentation, packing of fragmentated material in a bag, affixture of material information on the bag) are performed to be transported to the material manufacturer 12 or the manufacturing factory 1 shown in FIG. 1 and ultimately reused as the restored material. The material information affixture applied to the bag should contain at least the name of the material, use history and the weight or mass. As a method of affixing the information, there may be mentioned a method of printing necessary description information by means of an ink jet printer and a method of printing the information on a paper sheet which is then affixed. Alternatively, the disassembled part information 62 applied to the cover 60 as mentioned above may be detached and applied to the bag filled with the restored material. FIG. 15 shows a process for detaching reuse-destined parts from a dismounted printed circuit board assembly 67. The printed circuit board assembly 67 is transferred to the above-mentioned process in the manufactured article recycling system on and along the disassembled part transferring line 63. The disassembling worker 61 reads out the disassembled part information 62 affixed to the printed circuit board assembly 67 with the aid of the bar code reading device 68 which is connected to the recycle method decision processor unit 29, whereby the processing or treatment method of the printed circuit board assembly 67 is displayed on the processing result display device 38 from the information of the recycle processing method decision result on the basis of the information read out from the printed circuit board assembly 67. On the other hand, the information 64 concerning the parts to be separated in the process is printed out on a sheet of paper or the like by means of the information output printer 48. The information as outputted may contain the identification number, name, material, weight, recycle processing method and the use history of each part separated in the process as well as the manufacturer name of the manufactured article in which the parts are used, the article name, the model name, the manufactured date, the manufacture ID number, etc. of the article, which are displayed in the form of characters and bar codes. The disassembling worker 61 works while viewing the contents displayed on the processing result

display device 38. In the case of the processing result display device 38 shown in FIG. 15, a reuse-destined part (transformer A 65) which is then placed on a reuse-destined part transferring line 66 after having affixed with reuse-destined part information 64. The transformer A 65 is then sent to a succeeding part restoration treatment process, wherein the process or treatment is performed in accordance with the reuse-destined part information 64.

Detailed Description Text - DETX (151): In any case, the article, the part, the assembly and the material sent to the respective succeeding treatment process or processing factory concerned should be affixed with the information which is required for the recycle processings mentioned above. Thus, the proper recycle processings decided by the recycle method decision processor unit 29 can be carried out successively in the relevant processes or the facilities, respectively. In this manner, the manufactured article recycling system according to the present invention can be operated.

Detailed Description Text - DETX (184): Component parts (single-material parts and multi-material parts) which constitutes a manufactured article concerned are previously affixed at least with information of inherent codes indicating the parts and information concerning the materials forming the parts, respectively. As an example of the inherent code identifying the part, there may be mentioned a part name or identifier and a part number. Further, as an exemplary one of the methods of affixing the information on the part, there can be maintained a method of indicating the information in the form of characters and symbols, bar code or the like on the surface of the part. The standards for determining the basis for affixing such information to the parts can be established by designer or other person at the time when the disassembling procedure is determined or when the discarded article concerned was designed. However, when the case the parts are purchased from external part manufacturer, the latter may determine the information and affix the information to the part .

Detailed Description Text - DETX (186): Referring to FIG. 24, the recycling system is composed of a recycle method decision processor unit 29 for determining or deciding the recycle processing method, an input unit 34 for inputting or loading information or data, a recycling factory facility control unit 39 for controlling equipment or facilities installed within a recycling factory, a discarded article processing result recording unit 78 for recording information concerning harmfulness, separation or removal of hazardous components and the like, a statutory regulation/standard information database 36 for storing information of various legal controls or statutory regulations, standards, etc., a material/part-based recycle method database 37 for storing the recycle processing methods on a material-by-material basis and on a part-by-part basis, an article specifications information database 35 for storing article specifications information, a market information database 41 for storing information of the market prices of used parts, information concerning the demand for the parts concerned, and a recycling factory specifications database 74 for storing the specifications of the recycling factory and the like. Parenthetically, in FIG. 24, blocks which have some functions as those shown in FIG. 5 are designated by like reference characters.

Detailed Description Text - DETX (189): With a view to allow the specifications information of

articles subject to the processing to be referenced at the recycling factory 18, the article specifications information database 35 storing the specifications information of the articles subject to the processings is previously generated or created. Such article specifications information may be generated by a designer of the article upon designing thereof or after the designing. Registration of the article specifications information in the article specifications information database 35 may be carried out by a manufacturer of the article or a businessman entrusted by the manufacturer. The information registered in the article specifications information database 35 may contain only the information of articles (single type of articles or plural types of articles) of a certain specific manufacturer or alternatively the information of articles (single type or plural types of articles) of plural manufacturers.

Detailed Description Text - DETX (190): As the contents of the article specifications information, there may be enumerated manufacturer name, category or class of article, name of article, model name, manufactured date, manufacture ID number, component part information (part name, part number, part manufacturer, model name of part, harmfulness or non-harmfulness, possibility of reuse, use history, etc.), disassembling or decomposing methods (disassembling procedure, tool necessitated, disassemble guiding chart, etc.), standard number of disassembling steps or processes involved (hours), etc.

Detailed Description Text - DETX (191): The disassembling methods mentioned above are previously determined by the designer or other person the time of manufacture of discarded article. In this conjunction, it is required at the least to determine the disassembling method such that the discarded article concerned can be disassembled on the basis of the part affixed with the inherent code mentioned hereinbefore. To say in another way, all the parts detached or removed in accordance with the disassembling method must have inherent codes identifying these parts, respectively. Of course, information concerning the methods for further disassembly the parts separated or removed in accordance with the above-mentioned disassembling method may be made available.

Detailed Description Text - DETX (192): (2) This is a database storing the information of the statutory regulations and the standards concerning the sales of manufactured articles, discarded articles and discarded article processings or treatments in various countries concerned. As the information of this sort, there may be mentioned, for example, such information which concerns harmful materials /substances an hazardous materials inhibited from use in manufacturing articles or harmful materials, substances ad hazardous materials/substances which must not be used in reclaiming for landfill at the stable-type final disposal place or harmful materials/substances and hazardous materials/substances which must not be disposed of at managed-type final disposal place. The statutory regulations information may be acquired from official gazettes or the like and registered in a database. The information concerning the standards may be acquired from the organization which is in charge of supervising the standards and registered in a database. In this conjunction, it is preferable to create the databases on a category basis of the articles.

Detailed Description Text - DETX (194): This is database storing information concerning the recycle processing methods and disposal processing methods on a material basis and a part basis

and among others the processing methods for processing harmful materials/substances, the parts containing harmful materials/substances and the parts containing harmful materials/substances or hazardous materials/substances (e.g. detoxification processing method, restoration processing methods, disposal processing methods) and the information concerning persons capable of performing the processings mentioned above (residence address, communication address, processing or treatment cost, etc.). It is preferable to prepare the databases on a material basis and parts basis, respectively.

Detailed Description Text - DETX (196): This is a database containing information of the demand for used parts concerned, information of the market prices of various restored materials/substances concerned, information of purchasing prices for various restoration-destined used materials, information concerning possibility of accommodation by recycle processing persons, harmful/hazardous material processing persons and final disposal processing persons, information of used part buyers and various processing facilities (name, residence, television number, facsimile number, etc.), information of costs involved in various transfers and transportations.

Detailed Description Text - DETX (198): (5) This is a database storing various specifications information of the recycling factory 18 for processing the discarded articles. As the specifications information, there may be mentioned information concerning the costs involved in the processings conducted in the recycling factory 18 (e.g. cost required for processing per unit time, shredding cost per unit weight or unit volume). This database should be provided in each of the recycling factories, and maintenance/management of data should be carried out on a factory-by-factory basis.

Detailed Description Text - DETX (200): The recycle method decision processor unit 29 further includes a recycle method decision module 31 storing recycle processing decision procedures 32, a recycle method decision procedure editing module 30 and a recycle procedure generating module 33. (The recycle processing encompasses waste disposal processing.) Additionally, it is necessary to modify the rules for the recycle processings and the disposal processing as well as the recycle method decision procedure based on the above rules, as the occasion demands, because new recycle processing methods and disposal methods are developed from one to another in the course of time lapse. For this reason, the recycle method decision procedure editing module 30 mentioned above is provided in order to make it possible to correct or modify the recycle method decision procedure .

Detailed Description Text - DETX (201): Connected to the recycle method decision processor unit 29 are the four databases mentioned above so that the recycle method decision processor unit 29 can decide the recycle processing methods and generate the recycle processing decision procedures for the discarded articles on the basis of the information stored in the individual databases.

Detailed Description Text - DETX (203): The input unit 34 is a device for inputting to the recycle method decision processor unit 29 the article information of the discarded articles transported to the recycling factory 18, which information contains at least the manufacturer name, article name, type or model, manufactured date and the manufacture ID number. The input unit 34 can equally

be used for inputting the information affixed to be component parts detached from the discarded article.

Detailed Description Text - DETX (208): The recycling factory facility control unit 39 is additionally provided with a disassembling line control unit 42, a discarded article recycle method transmitting apparatus 73, an information output printer 48 and a discarded article processing status recording apparatus 72, which will be elucidated below in (8) to (11).

Detailed Description Text - DETX (210): The disassembling line control unit 42 is connected to the recycle method decision processor unit 29 in order to control operation of the disassembling work line in the recycling factory in accordance with the discarded article processing procedure generated by the recycle method decision processor unit 29.

Detailed Description Text - DETX (211): The discarded article recycle method transmitting apparatus 73 is connected to the recycle method decision processor unit 29 for indicating or messaging to workers concerned in the recycling factory 18 the discarded article processing procedure generated by the recycle method decision processor unit 29. As such discarded article recycle method transmitting apparatus 73, there is available a system for displaying as image information the processing procedure concerned with the aid of a display device such as television, display monitor or the like and a system for messaging the processing procedure in the form of voice information.

Detailed Description Text - DETX (213): The information output printer 48 is to serve for printing out information of parts detached or separated from the discarded article upon disassembling as well as materials/substances thereof (such part name, material/substance name, processing method, succeeding process destination, presence or absence of harmful material/substance, etc.) in the form of characters, symbols, bar codes or the like.

Detailed Description Text - DETX (217): The discarded article processing result recording unit 78 is employed recording the information concerning the parts detached from the discarded articles. Among others, the real results of removals of those parts which contain harmful materials/substances are recorded.

Detailed Description Text - DETX (222): In the step 250 of the discarded article processing, the article information affixed to the discarded article transported into the recycling factory 18 and containing at least the manufacturer name, article name, model or type, manufactured date and manufacture ID number is acquired to be inputted to the recycle method decision processor unit 29. As the methods for inputting the article code information affixed to the discarded article into the system, as in the case of the first embodiment, there may be conceived those mentioned below.

Detailed Description Text - DETX (229): The discarded articles which have been decided as the restoration-inhibited articles are then subjected to a check processing for determining whether or not any one of the component parts of the restoration-inhibited article contains harmful material/substance or hazardous material/substance (step 254). To this end, material/substance

information of the component parts contained in the article specifications information of the restoration-inhibited article as obtained in the step 250 mentioned above is compared with the harmful/hazardous material/substance information retrieved from the statutory regulation/standard information database 36 to thereby search the component parts containing the harmful material/substance or hazardous material/substance.

Detailed Description Text - DETX (230): Subsequently, on the basis of the component part information contained in the article specifications information obtained in the aforementioned step 250, decision is made as to whether or not these exist reuse-destined parts among those constituting the discarded article (step 255). The reuse-destined parts are determined in advance by the manufacturer of the discarded article so that the information of the reuse-destined part is stored on a part-by-part basis as one of the component part information which is contained in the article specifications information of the discarded article (see FIG. 7).

Detailed Description Text - DETX (231): However, even when the information predetermined by the manufacturer as mentioned above is unavailable, further decision processings mentioned below is executed for those component parts which are decided as "commercially demanded" on the basis of the used part demand information stored in the market information database 41.

Detailed Description Text - DETX (232): For a given component part for which the information "commercially demanded" is derived from the used part demand information, the purchase price of a corresponding used part commercially handled by the sued part dealers is retrieved from the used part demand information. Furthermore, the disassembling cost involved in separating or detaching the part from the discarded article as well as the fee charged for transportation is estimated by calculation, whereon the cost corresponding to the sum of the disassembling cost and the transportation fee is compared with the purchase price of the used part dealers for determining whether or not profit is resulted. When the profit is gained, then the part concerned is decided.

Detailed Description Text - DETX (234): At first, description will be directed to a disassembling cost estimating calculation processing method which is carried out by the recycle method decision processor unit 29. Information or data required for the part disassembling cost estimating method and the information source from which such information can be obtained are mentioned in the following sections captioned (1) to (3), respectively.

Detailed Description Text - DETX (236): As can be seen from the contents of the article specifications information database 35 shown in FIG. 26, the above-captioned information can be made available by registering previously the disassembling method information in the article specifications information database 35. When one of the disassembling method information contained in the article specifications information of the article is given by a disassembling process time required therefor, the design of the article concerned arithmetically estimates a standard disassembling process (standard time) in advance to thereby store the estimated value in the article specifications information database 35, as shown in FIG. 26. By way of example, referring to FIG. 26, when the used article demand exists for the part "PWB ASS'Y" identified by a disassembling sequence number "7" (i.e., when the recycle method decision processor unit 29

determines on the basis of the used part demand information contained in the market information database 41 that the part "PWB ASS'Y" is commercially demanded), the standard disassembling process costs for the disassembling sequence numbers "1" to "7" are added together to thereby calculate the standard disassembling process cost for disassembling and separating or detaching the components "PWB ASS'Y".

Detailed Description Text - DETX (241): On the basis of the information mentioned above, the part disassembling cost can be arithmetically estimated. For calculating the cost for disassembling and detaching a given part, the standard disassembling process number mentioned at (1) is multiplied by the cost required for the unit disassembling process (time) in the recycling factory conducting the discarded article processing or treatment, to thereby determine the disassembling/separating cost. Further, the disassembling/separating cost is added with predetermined miscellaneous costs such as packing cost read out from the recycling factory specifications database 74.

Detailed Description Text - DETX (242): Next, description will be made of the information or data required for calculating the transporting fee or cost involved in transporting the part as well as the relevant information source.

Detailed Description Text - DETX (244): (4) Outer dimensions information of component part

Detailed Description Text - DETX (245): This information can be obtained by registering the outer dimensions on a part-by-part basis in the article specifications information database 35.

Detailed Description Text - DETX (246): (5) Addresses information of used part dealers

Detailed Description Text - DETX (247): This information can be obtained by registering the addresses of the reused-part buyers or the like in the market information database 41.

Detailed Description Text - DETX (250): On the basis of the information mentioned above, the transportation fee of the part is estimated. More specifically, the outer dimensions of a part concerned is estimated on the basis of the outer dimensions information of that part, while the transportation distance is arithmetically estimated on the basis of the address information of the used part dealer who purchases the part. On the basis of both the information mentioned above, the transportation fee to be charged for the door-to-door delivery service is searched from the relevant database. In succession, the cost determined as the sum of the disassembling/separating cost (inclusive of the packing cost and other miscellaneous costs) and the transportation fee is compared with the part purchase price of the used part dealer retrieved from the market information database 41. When the disassembling/separating cost is lower than the purchase cost, it is then determined that the part concerned is to be disassembled and separated as the reuse-destined part.

Detailed Description Text - DETX (252): By way of example, it is assumed that the separation/sorting procedure for the part containing harmful/hazardous material/substance and the

reuse-destined part of a given article is decided to be the procedure up to the disassembling sequence number "9" in the article disassembling method information shown in FIG. 26 and that the part s which belong to neither the class of the part containing harmful/hazardous material/substance nor the class of the reuse-destined parts correspond to the parts of the disassembling sequence numbers "1", "2", "3", "4", "5", "6" and "8". For the parts decided as belonging to neither of both the classes mentioned above, the part numbers thereof are read out from the disassembling method information (see FIG. 26). On the basis of the part numbers, the component part information (see FIG. 7) is read out from the article specifications information of the article concerned as read out from the article specifications information database 35. Subsequently, on the basis of the component part information read out, the part processing methods are searched from the material/part-based recycle method database 37, which stores therein the processing or treating method information on a part -by-part basis and the processing method information on a material -by-material basis. The search of the part processing method information is performed in the order mentioned below.

Detailed Description Text - DETX (261): When the detaching/separating command is to be issued for the part "PWB ASS'Y" having the detaching sequence number "7", a reference disassemble drawing No. (D1004) is read out from the article disassembling information, whereupon on the basis of the information read out, the disassemble drawing corresponding to the reference drawing No. is retrieved from the article specifications information database 35 and displayed on a picture display device 75. At this time point, it is displayed which of the part containing harmful/hazardous material/substance, reuse-destined part and the other part the part decided to be detached in the preceding step belongs to. Further, when the part to be detached belongs to the category of the part containing harmful/hazardous material/substance, then the harmful/hazardous material/substance contained in that part are displayed as well. Additionally, information concerning the quantity or number of parts to be detached and tools to be used is messaged in the form of voice. In the disassembling or detaching method illustrated in FIG. 26, "+D" designates a screw driver having a cross-like tip. Corresponding to the information for the tool "+D", voice information "plus driver" is generated and recorded. The voice information is transmitted to the worker by way of a loud speaker 76.

Detailed Description Text - DETX (262): Furthermore, in order to make the worker to input information of the part code affixed to the detached part and information concerning the constituent material or substance, locations of the part code and the constituent material information are displayed.

Detailed Description Text - DETX (263): The worker detaches the part(s) in accordance with the command and reads out the part code information and the constituent material information, both of which are inputted to the recycle method decision processor unit 29. The information read-out input method will differ in dependence on the manner in which the code information and the constituent information are made available. When the information concerned is indicated in the form of characters and/or symbols, the worker reads out visually the information and inputs it by manipulating the keyboard 45 and the mouse 47. On the other hand, when the information concerned is indicated in the form of a bar code, the worker uses the bar code reading device 46

for reading and inputting the information. (In the case of the example illustrated in FIG. 27, the bar code reading device 46 is used to this end.)

Detailed Description Text - DETX (264): The information of the part code affixed to the part detached as well as the constituent material information as inputted and additionally the information concerning the category of the part (i.e., part containing harmful/hazardous material/substance or the reuse-destined part or the other part) decided as described above are recorded by the discarded article processing result recording unit 78 (step 260). Moreover, for the so-called other part (i.e., part other than the part containing harmful/hazardous material/substance and the reuse-destined part), information concerning the processing method (shredding/separation or restoration of material or conversion into oil or incineration or landfill) is equally recorded. Besides, the information of the dealer for the parts decided in the manner described hereinbefore (e.g. dealer's name, code identifying dealer, etc) is also recorded.

Detailed Description Text - DETX (265): Next, it is decided in a step 261 whether or not the part containing harmful/hazardous material/substance and/or the reuse-destined parts to be detached from the discarded article concerned as retrieved in the aforementioned steps 254 and 255 have all been detached or separated. This decision can be validated by deciding whether the information of the part bar codes affixed to the parts and that of the constituent materials have been recorded. If there remain the part containing harmful/hazardous material/substance or the reuse-destined parts to be detached, the procedure proceeds to the step 259 for commanding the disassembling and detachment. If otherwise, then a step 262 is executed.

Detailed Description Text - DETX (271): Finally, operation of the discarded article processing status recording apparatus 72 is stopped (step 263). In the foregoing, the processing procedures executed in the recycling factory 18 according to the invention incarnated in the instant embodiment have been described.

Detailed Description Text - DETX (274): Furthermore, since the part containing harmful/hazardous material/substance, reuse-destined parts and the other parts detached from the discarded article undergone the processing are fixed with respective code information and the constituent material information, the actual reception records of the parts can be facilitated because it is sufficient for preparing such records to read the information affixed to the parts. Besides, management of the parts as well as the decision as to the processing which the parts are to undergo can be facilitated.

Claims Text - CLTX (8): wherein said recycle decision means makes decision on the basis of the information affixed to said article as inputted through said reading means as to whether or not said article satisfies a condition that said article has a remaining life falling within said restoration-allowable life limit of said article as stored in said article specifications information database, wherein when the remaining life of said article falls within said restoration-allowable life limit, said recycle decision means issues a recycle processing decision result indicating that said article is subject to restoration as a restored article, and if otherwise, said recycle decision means issues a recycle processing decision result indicating that said article is subject to a disassembling

processing for disassembling said article to individual component parts.

Claims Text - CLTX (11): that said recycle decision means is so arranged that when said article is decided as being subject to restoration as a restored article, said recycle decision means further makes decision on the basis of the information affixed to said article and inputted through said reading means as to whether or not said article conforms to said statutory regulation information and said standard information relevant to said article and stored in said at least one of statutory regulation and standard information database, wherein when said statutory regulation information and said standard information are abided by said article, said recycle decision means issues a recycle processing decision result indicating that said article is subject to restoration as a restored article, and if otherwise, said recycle decision means issues a recycle processing decision result indicating that said article is subjected to a disassembling processing for disassembling said article to individual component parts.

Claims Text - CLTX (14): said recycle decision means is arranged such that when said recycle decision means indicates as the result of said recycle processing decision that said article is subject to restoration, said recycle decision means extracts the information of said quality check procedure and said quality criterion information from said article specifications information database; and

Claims Text - CLTX (15): that said output means outputs the information of said quality check procedure and said quality criterion of said article as extracted by said recycle decision means.

Claims Text - CLTX (19): characterized in that the information affixed to said manufactured article and inputted through said reading means further contains part information concerning component parts of said article;

Claims Text - CLTX (20): said at least one of statutory regulation and standard information database further stores the statutory regulation information and the standard information for the component parts of said article, respectively; and

Claims Text - CLTX (21): that said recycle decision means is so arranged that when said article is decided as being subject to said disassembling processing falls within the restoration-allowable life limit and when said article does not conform to said statutory regulation information and said standard information, said recycle decision means further makes decision for each of said component parts as to whether or not said component part is subject to reuse and as to whether or not said component part conforms to said statutory regulation information and said standard information relevant to said component part and stored in said at least one of statutory regulation and standard information database, wherein when said component part is subject to reuse and when said statutory regulation information and said standard information are abided by said component part, said recycle decision means issues a recycle processing decision result indicating that said component part is a reusable component part, and if otherwise, said recycle decision means issues a recycle processing decision result indicating that said component part is subjected to other recycle than the reuse.

Claims Text - CLTX (23): characterized in that the article specifications information database further stores therein information concerning quality check procedure to be performed for each component part and quality criterion information ;

Claims Text - CLTX (24): said recycle decision means is arranged such that when said recycle decision means indicates as the result of said recycle processing decision that said component part is reusable, said recycle decision means extracts the information of said quality check procedure and said quality criterion information from said article specifications information database; and

Claims Text - CLTX (27): characterized in that the information affixed to the manufactured article and inputted through said reading means further contains information of materials of said component parts;

Claims Text - CLTX (28): said storage means includes as said database a material-based recycle processing method database which stores information concerning harmfulness or hazardousness of materials of said component parts and recycle processing methods for said materials, respectively;

Claims Text - CLTX (30): that said output means outputs the information of said recycle processing method of said component part as extracted by said recycle decision means.

Claims Text - CLTX (33): said recycle decision means extracts the classifying procedures and the detaching work procedures for the component parts of harmful or hazardous material for the article which is decided as being subject to said disassembling processing by referencing said material-based recycle processing method database; and

Claims Text - CLTX (34): that said output means outputs the classifying procedures and the detaching procedures for said component parts as extracted by said recycle decision means.

Claims Text - CLTX (38): characterized in that the information affixed to the manufactured article and inputted through said reading means further contains information of materials of said component parts; and

Claims Text - CLTX (41): characterized in that the information affixed to the manufactured article and inputted through said reading means further contains information of materials of said component parts;

Claims Text - CLTX (42): said storage means includes as said database a material-based recycle processing method database which stores information concerning capability of restoration or burning or disposability as waste of said component parts, respectively; and

Claims Text - CLTX (47): that said output means outputs the information of said recycle processing method of said component part as extracted by said recycle decision means.

Claims Text - CLTX (50): said recycle decision means extracts the disassembling procedures for the component parts of the article which is decided as being subject to said disassembling processing by referencing said article specifications information database; and

Claims Text - CLTX (51): that said output means outputs the disassembling procedures of the component parts as extracted by said recycle decision means.

Claims Text - CLTX (53): characterized in that said output means includes at least one of voice output means for generating voice information, video information output means for generating image information and printing means for generating printed information in order to output the detaching procedures for said component parts.

Claims Text - CLTX (59): that said output means outputs the used article market price information for said article as extracted by said recycle decision means.

Claims Text - CLTX (65): characterized in that said system further comprises an equipment control unit for controlling facilities for executing the recycle processing on the basis of the result of decision made by said recycle decision means.

Claims Text - CLTX (67): characterized in that said manufactured article includes memory means for storing as information affixed to said manufactured article information concerning at least name of the article, manufacturer name of the article, model name of the article, manufactured date, manufacturing number and component parts of the article, and output means for outputting information affixed to said manufactured article and stored in said memory means; and

Claims Text - CLTX (70): recycle decision means for deciding said recycle processing for said article by referencing said information for the reuse of said article contained in said database stored in said storage means on a basis of the information affixed to the article and read through said connecting means; and

Claims Text - CLTX (76): recycle decision means for deciding said recycle processing for said article by referencing said information for the reuse of said article contained in said database stored in said storage means on a basis of the information affixed to the article and received through said radio receiver means; and

Claims Text - CLTX (82): recycle decision means for deciding said recycle processing for said article by referencing said information for the reuse of said article contained in said database stored in said storage means on a basis of the information affixed to the article and corresponding to the bar code inputted through said bar code reading means; and

Claims Text - CLTX (88): recycle decision means for deciding said recycle processing for said article by referencing said information for the reuse of said article contained in said database stored in said storage means on a basis of the information affixed to the article and read out from said removable memory means driven by said driving means; and

Claims Text - CLTX (110): first storage means for storing first information relating to a plurality of parts combinable to form different articles;

Claims Text - CLTX (111): second storage means for storing second information relating to a plurality of recycle processes corresponding to properties of said parts ;

Claims Text - CLTX (113): computation means for extracting the first information relating to a part of an article inputted by an input means from said first storage means, and extracting said second information relating to said part to be extracted from the first storage means from said second storage means; and

Claims Text - CLTX (115): 28. A manufactured article recycle system according to claim 27, wherein one of said properties of said parts is information relating to at least one of a harmful material, a hazardous material and multi-material contained in said part.

Claims Text - CLTX (119): a first storage unit which stores first information relating to a plurality of parts combinable to form different articles;

Claims Text - CLTX (120): a second storage unit which stores second information relating to a plurality of recycle processes corresponding to properties of said parts ;

Claims Text - CLTX (122): an extractor which extracts the first information from said first storage unit relating to a part of an article inputted by said input unit and which extracts second information from said second storage unit relating to said part in accordance with the first information extracted from first storage unit relating to said part; and

Claims Text - CLTX (124): 32. A manufactured article recycle system according to claim 31, where one of the properties of said part is information relating to at least one of a harmful material, a hazardous material and a multi-material contained in said part.